Dermatology Practical & Conceptual

Attitudes Towards Artificial Intelligence Among Dermatologists Working in Saudi Arabia

Fatima Al-Ali[1], Sam Polesie[2,3], John Paoli[2,3], Mohammed Aljasser[4, 5], Louai A Salah[6]

1 Department of Internal Medicine, King Hamad University Hospital, Muharraq, Bahrain
2 Department of Dermatology and Venereology, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
3 Region Västra Götaland, Sahlgrenska University Hospital, Department of Dermatology and Venereology, Gothenburg, Sweden
4 College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia
5 Division of Dermatology, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia
6 Dermatology Department, East Jeddah General Hospital, Ministry of Health, Jeddah, Saudi Arabia

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Corresponding Author: Louai A Salah, Dermatology Department, East Jeddah Hospital, 2277 King Abdullah Rd, Al Sulaymaniyah, Jeddah 22253, Makkah, Saudi Arabia. Tel: 012 232 7555 E-mail loai.salah@gmail.com

ABSTRACT

Introduction: Artificial intelligence (AI) and its applications are among the most discussed modern technologies today. Despite the rapidly expanding use of AI in medicine, and specifically in dermatology, only a few studies have studied the attitude of physicians toward AI.

Objective: To recognize the attitudes towards AI among dermatologists in the Kingdom of Saudi Arabia.

Methods: A cross-sectional survey was done among dermatologists in Saudi Arabia. Questionnaires were distributed through several online channels.

Results: Overall, 103 dermatologists filled out the survey. The majority saw very strong or strong potential for AI in the automated detection of skin diseases based on dermatological clinical images (50.9%), dermoscopic images (66.6%) and within dermatopathology (66.6%). In regard to results of attitudes towards AI, 56.6% and 52. 8% agreed that AI will revolutionize medicine and dermatology, respectively. However, many of the respondents disagreed that AI will replace physicians (41.5%) and human dermatologists (39.6%) in the future. Age did not impact the overall attitude of dermatologists.

Conclusion: Dermatologists in Saudi Arabia showed an optimistic attitude towards AI in dermatology and medicine. However, dermatologists believe that AI will not replace humans in the future.

Introduction

With the current advancement of technology, algorithms have taken on a huge role in the field of medicine and displaced much of the work of physicians. Artificial intelligence (AI) and its application in various fields are considered one of the most talked about modern technologies today. Experts in medicine have described AI as the stethoscope of the 21st century [1].

AI is a revolution that can help optimize any job. A recent review showed a promising impact on the sensitivity and accuracy in the screening of skin lesions and skin cancer detection [2]. Multiple recent studies demonstrated the benefits of AI. Worldwide, there is an increasing number of impressive attempts at the rapid leveraging of this technology in dermatology [3].

With the rapidly expanding use of AI in medicine and specifically in dermatology, there are only a few studies that discussed the attitude of physicians towards AI. In order to understand the attitudes, an online survey was prepared.

Objective

The goal of the current study is to understand the attitudes towards AI among dermatologists in the Kingdom of Saudi Arabia. To our knowledge, this topic has never been investigated through research in Saudi Arabia.

Materials and Methods

A cross-sectional survey was prepared. Survey forms were disseminated electronically through the Saudi Society of Dermatology and Dermatologic Surgery mailing group and a Saudi dermatologists' WhatsApp group during the months of September 2020, March and July 2021. Included in the study were dermatologists (consultants and specialists) working or having worked in Saudi Arabia at the time of the survey and who had online access.

The survey was adapted from the form used in an original study by two of the authors [4]. It contained 30 questions including socio-demographic data (gender, age, main practice setting, and years of working in Saudi Arabia), their background knowledge and sources of AI and, lastly, their feelings and attitudes towards AI in dermatology.

Analysis and data management were done using IBM SPSS software version 23 (IBM Corp., Armonk, N.Y., US). Results were presented as counts and percentages for categorical variables while numerical variables were presented by mean and standard deviations. Also, the General Linear Regression Model (GLRM) was used to determine the relation of sex and group with attitudes using scores for the answers. *P*-values <0.05 were considered statistically significant.

Results

Among the 103 dermatologists who responded to the survey, 87 (84.5%) were practicing dermatology in Saudi Arabia and 9 (9.4%) were not, at the time of the study (Table 1). The majority of the respondents were male (n=33, 67.3%), mostly between the ages of 31 to 40 years old (n=17, 34.7%) and had 6-10 years (n=14, 28.6%) experience in dermatology. In regards to their main practice setting, most of the

Table 1. Socio-demographic characteristics of respondents in the study (n = 103).

Variables		
	n	Percentage(%)
Practicing in Saudi Arabia		
Yes	87	84.5
No	9	8.7
Skipped	7	6.7
Distribution of answers to the questions below:		
Answered	49	47.6
Skipped	54	52.4
Gender		
Female	16	32.6
Male	33	67.4
Age		
21-30 years	2	4.1
31-40 years	17	34.7
41-50 years	7	14.3
51-60 years	8	16.3
61-70 years	15	30.6
Main practice setting		
University hospital	12	24.5
Military hospital	5	10.2
Public teaching hospital	8	16.3
Public non-teaching hospital	8	16.3
Private clinic	10	20.4
Private hospital	4	8.2
Other	2	4.1
Years of working in dermatology		
0-5 years	5	10.2
6-10 years	14	28.6
11-15 years	6	12.2
16-20 years	4	8.2
21-25 years	8	16.3
26-30 years	2	4.1
31-35 years	5	10.2
36-40 years	4	8.2
40 above years	1	2

respondents practiced in University hospitals (n=12, 24.5%) followed by private clinics (n=10, 20.4 %), public teaching hospitals (n=8, 16.3%) and public non-teaching hospitals (n=8, 16.3%).

Answers regarding background knowledge in AI revealed that 46 (63.9%) knew about AI as a topic in dermatology. However, 11.1% (n=8) had excellent knowledge when it comes to AI in dermatology and the majority (n=20, 27.8%) had only heard about it but not more (Table 2). Meanwhile, when asked about their source of AI information, 68.8%, 65.6%, 42.2% and 32.8% heard about AI from social media, media, friends, and lectures, respectively (Table 3).

In regard to potential applications of AI in dermatology, respondents believed that AI has a strong potential in the automated detection of skin diseases based on clinical dermatological images (n=20, 35.1%), on dermatoscopic images (n=28, 49.1%) and on dermatopathology images (n=23, 40.4%) (Table 4).

More than half of the respondents considered themselves as well-educated regarding the use of modern technology (n=28, 52.8%). The majority of respondents had read medical publications regarding AI within dermatology (n=25, 51%) while most had not used AI as a diagnostic aid in real life (n=34, 69.4%) (Table 5).

Results of attitudes towards AI revealed that age did not affect the attitudes of dermatologists toward AI overall. In general, 56.6% (n=30) and 52.8% (n=28) agreed that AI will generally revolutionize medicine and dermatology, respectively. Twenty-six (49.1%) agreed that dermatology and medicine become more exciting to them with the increased use of AI. More than half agreed that AI will improve dermatology (n=30, 56.6%) and medicine in general (n=27, 50.9%) and almost half (n=24, 45.3%) agreed that AI must be part of medical training. However, most respondents expressed disagreement regarding AI replacing physicians

Table 2. Distribution of answers regarding background knowledge of artificial intelligence.

	Count	Percent (%)
AI is a topic that has become of interest to the Dermatology community. Were you already aware of this topic in Dermatology?		
Yes	46	63.9
No	26	36.1
Which degree of knowledge would you say you have when it comes to AI within Dermatology?		
Excellent Knowledge	8	11.1
Good Knowledge	14	19.4
Basic Knowledge	19	26.4
I have heard about it, but not more	20	27.8
I have never heard about it	11	15.3

*72 (69.9.%) participants answered this part

Table 3. Distribution of answers regarding sources of knowledge on artificial intelligence.

Sources	Count	Percent (%)
Media		
Yes	42	65.6
No	22	34.4
Social Media		
Yes	44	68.7
No	20	31.2
Lectures		
Yes	21	32.8
No	43	67.2
Friends		
Yes	27	42.2
No	37	57.8

*64 (62.1%) participants answered this part

Table 4. Distribution of answers regarding the potential of artificial intelligence in dermatology*.

Question Choices	Very strong potential	Strong potential	Moderate potential	Low potential	No potential	I don't know
Automated detection of skin diseases based on dermatological clinical images?	9(15.8%)	20(35.1%)	16(28.1%)	10(17.5%)	1(1.7%)	1(1.7%)
Automated detection of skin diseases based on dermatoscopic images?	10(17.5%)	28(49.1%)	13(22.8%)	5(8.8%)	0(0%)	1(1.7%)
Automated detection of skin diseases based on dermatopathology images?	15(26.3%)	23(40.3%)	11(19.3%)	6(10.5%)	0(0.%)	2(3.5%)

*57 (55.3%) participants answered this part

Table 5. Distribution of answers regarding attitudes towards artificial intelligence among dermatologists in Saudi Arabia.

Section 1*						
Question Choices	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree	I don't know
AI will revolutionize Medicine in general.	16(30.2%)	30(56.6%)	4(7.5%)	2(3.8%)	0(0.0%)	1(1.9%)
AI will revolutionize Dermatology	16(30.2%)	28(52.8%)	4(7.5%)	3(5.7%)	0(0.0%)	0(0.0%)
AI will revolutionize Dermatology more than other medical specialties in general.	6(11.3%)	15(28.3%)	16(30.2%)	10(18.9%)	2(3.8%)	4(7.5%)
In the foreseeable future, all physicians will be replaced by AI.	2(3.8%)	4(7.5%)	5(9.4%)	22(41.5%)	17(32.1%)	3(5.7%)
The human dermatologist will be replaced by AI in the foreseeable future.	2(3.8%)	3(5.7%)	5(9.4%)	21(39.6%)	18(34%)	4(7.5%)
A development with an increased use of AI in Dermatology frightens me.	3(5.7%)	6(11.3%)	9(17%)	23(43.4%)	12(22.6%)	0(0.0%)
A development with an increased use of AI in Dermatology makes Dermatology more exciting to me.	14(26.4%)	26(49.1%)	12(22.6%)	1(1.9%)	0(0.0%)	0(0.0%)
A development with an increased use of AI makes Medicine in general more exciting to me.	13(24.5%)	26(49.1%)	11(20.7%)	1(1.9%)	2(3.8%)	0(0.0%)
AI will improve Dermatology.	15(28.3%)	30(56.6%)	5(9.4%)	1(1.9%)	2(3.8%)	0(0.0%)
AI will improve Medicine in general.	16(30.2%)	27(50.9%)	7(13.2%)	1(1.9%)	1(1.9%)	1(1.9%)
AI should be part of medical training.	21(39.6%)	24(45.3%)	5(9.4%)	2(3.8%)	0(0.0%)	1(1.9%)
Section 2**						
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree	I don't know
I consider myself well informed about the use of modern technology, especially computers.	13(26.5%)	28(52.8%)	3(6.1%)	5(10.2%)	0(0.0%)	0(0.0%)
	Yes	No				
Would you consider yourself to be someone who enjoys technology?	47(95.9%)	2(4.1%)				
Have you read any medical publications regarding AI within Dermatology?	25(51.1%)	24(49%)				
Have you used AI as a diagnostic aid in real life within Dermatology?	15(30.6%)	34(69.4%)				

*53 (51.5%) participants answered this part
** 49 (47.6) participants answered this part

(n=22, 41.5%) and human dermatologists (n=21, 39.6%) in the future. In addition, 43.4% (n=23) were not frightened about the increased use of AI. The majority of respondents were neutral regarding the proposal that "AI will revolutionize dermatology more than other medical specialties" (n=16, 30.2%).

Discussion

In this cross-sectional study, dermatologists in Saudi Arabia showed a positive attitude towards AI. Most of the respondents had not used AI in diagnosis in real settings but generally agreed that AI will revolutionize dermatology and medicine.

While 63,9% of the respondents were aware of AI as a topic in dermatology, the majority of them had only heard about it (n=20, 27.8%) and only 11.1% had excellent knowledge. Although the awareness of AI among dermatologists was lower compared to the report of Polesie *et al.* [4], respondents viewed AI as having strong potential in the detection of skin diseases. Dermatologists saw a stronger potential of AI in detection using dermatoscopic images and within dermatopathology than with dermatological clinical images [4].

In our study, although respondents were optimistic about the increased use of AI in the development of dermatology and medicine in general, the majority (n=21, 39.6%) disagreed that AI will replace doctors. Only 3.8% strongly agreed while 5.7% agreed with this hypothesis. This is consistent with other studies about AI. Polesie *et al.* reported similar results in which only 5.5% of the participants agreed that human doctors will be displaced by AI [4]. Krittanawong also concluded that although AI may become more effective in diagnosis and image recognition, it cannot replace physicians [5]. In a 2017 survey in the United States, the majority of the respondents were worried about computers replacing humans in the future [6]. This was not the case in Korea, in which only 35.4% of the participants agreed that AI will displace physicians in the future [7].

In this study, the relationship between sex and age was determined and examined. The findings revealed that dermatologists' attitudes toward AI were unaffected by their age. Similar results were found in the study of Polesie *et al.* [4].

The current study has some limitations. First, since this is a cross-sectional survey, selection bias and social desirability biases are possible. Due to the selected method of distributing the survey, the response rate could not be calculated. Participants may be more optimistic than those who did not participate. Second, not all the questions in the survey were answered by the participants, some were skipped, resulting also in possible selection bias.

Conclusion

Dermatologists in Saudi Arabia showed an overall positive attitude towards AI in dermatology. Overall, age did not affect the attitudes of dermatologists about AI. Furthermore, results showed that most dermatologists were aware of the potential of AI in the automated detection of skin diseases using dermatoscopic, histopathological and clinical dermatological images. Moreover, they agreed that AI will revolutionize dermatology and the development of AI within our specialty seemed exciting to them. However, most participants believed that AI will not replace physicians in the future.

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